CLAIMS

What is claimed is:

1. A method, comprising:

obtaining a sample of a downstream signal conveyed along a signal path;

performing an analysis of the sample;

determining a presence or an absence of a fault in the signal path based on the analysis of the sample;

indicating a presence or an absence of a fault in the signal path by transmitting a diagnostic signal to an upstream node; and

if the presence of the fault is indicated, isolating a location of the fault as a function of the diagnostic signal.

2. The method of claim 1, wherein isolating includes identifying a cause of the fault as a function of the diagnostic signal.

3. The method of claim 1, wherein the absence of the fault in the signal path is indicated by the absence of a response signal.

4. The method of claim 1, wherein the upstream node includes a central office.

5. The method of claim 1, wherein the signal path composes a digital subscriber loop.

6. The method of claim 1, further comprising:

injecting the diagnostic signal into an upstream signal;

amplifying the upstream signal; and

transmitting the upstream signal to the upstream node.

7. The method of claim 1, further comprising:

generating a loopback command at the upstream node;

injecting the loopback command into the downstream signal;

transmitting the downstream signal from the upstream node via the signal path;

filtering the loopback command out of the downstream signal;

detecting the loopback command; and

executing the loopback command.

8. The method of claim 7, further comprising monitoring a characteristic of the downstream signal.

9. The method of claim 7, further comprising generating a loopback response signal as a function of both the loopback command and the characteristic of the downstream signal.

10. The method of claim 1, further comprising amplifying the downstream signal.

11. The method of claim 7, further comprising analyzing the loopback command for code sequence and parity characteristics.

12. The method of claim 11, wherein analysis of the loopback command is accomplished by executing a set of instructions on a data processor.

13. The method of claim 7, wherein the loopback command occupies a frequency band in common with the downstream signal.

14. The method of claim 9, wherein the loopback response occupies a frequency band in common with the upstream signal.

15. The method of claim 7, further comprising isolating faults in the signal path as a function of the loopback response.

16. The method of claim 7, further comprising frequency division duplexing a downstream frequency band and an upstream frequency band.

17. The method of claim 9, wherein a frequency band of the loopback response is specific to a repeater.

18. The method of claim 7, further comprising:
filtering out the loopback response from the upstream signal; and
detecting the loopback response at the upstream node.

19. An apparatus, comprising:
a first band pass filter;
a detection unit coupled to the first band pass filter;
a data processor coupled to the detection unit;
a health checking unit coupled to the microcontroller;
a digital to analog converter coupled to the microcontroller;
a low pass filter coupled to the digital to analog converter; and
a summer coupled to the low pass filter.

20. The apparatus of claim 19, further comprising:
a high pass filter;
a downstream amplifier coupled to the high pass filter;
a high pass diplexing filter coupled to the downstream amplifier;
an upstream amplifier coupled to the summer;
a low pass diplexing filter coupled to between the upstream amplifier and the high pass filter; and
a second band pass filter coupled between the high pass diplexing filter and the summer.

21. The apparatus of claim 19, wherein the health checking unit includes at least one member selected from the group consisting of a temperature monitor, a signal power monitor, and a galvanometer.

22. The apparatus of claim 19, wherein the data processor includes a programmable logic device

23. The apparatus of claim 19, wherein the data processor includes a microcontroller.